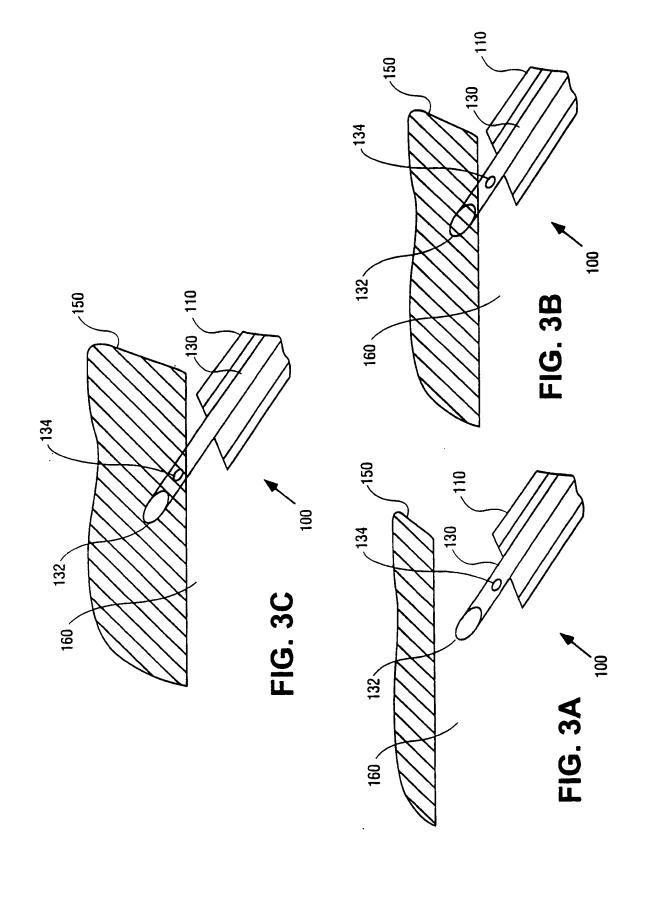


FIG. 2A



Region C - 430 Time (seconds) Region B - 420 Side hole occlusion _ Needle lumen occlusion Region A - 410 (stlod) grussorf nochoof n E binl 7 1.2 + -

Figure 4

Fluid Injection Prossure
Saline, 0.002" Aperture 1 mm Proximal to Needle Tip

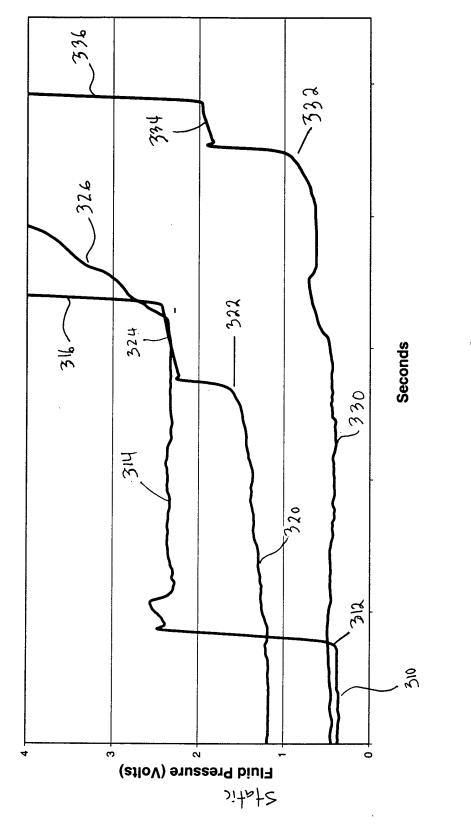
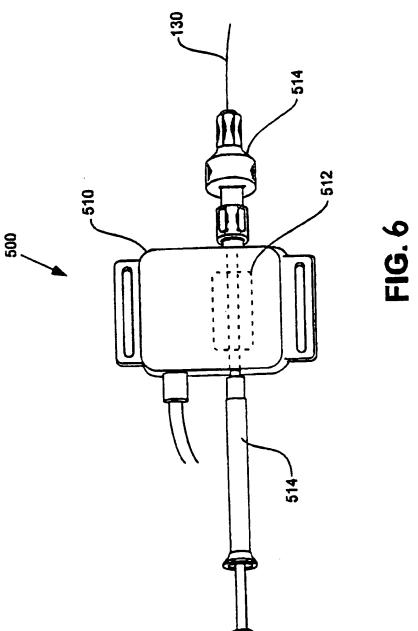
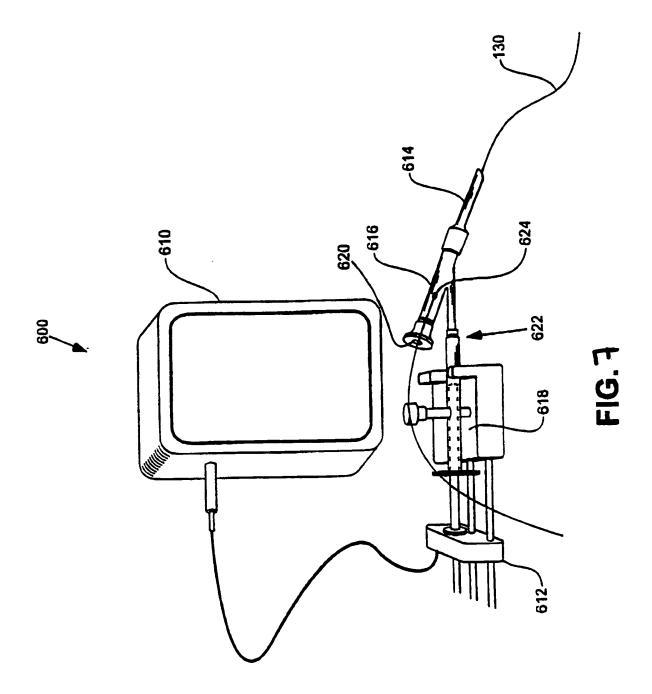


Figure 5





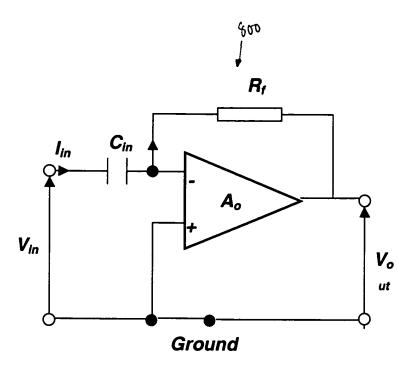
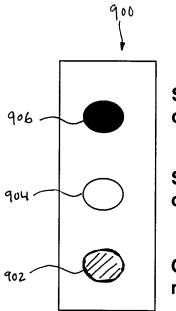


FIGURE 8

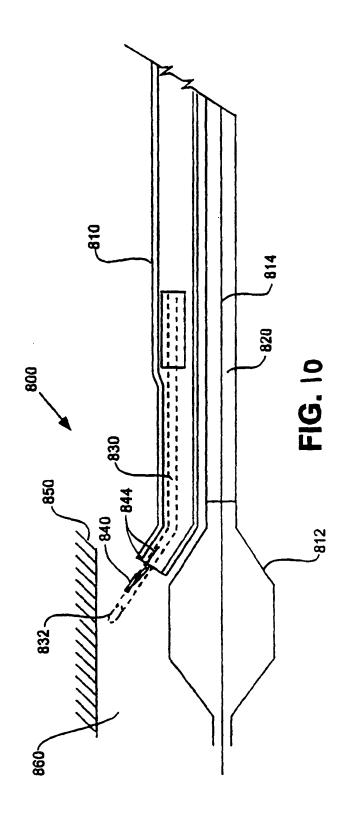


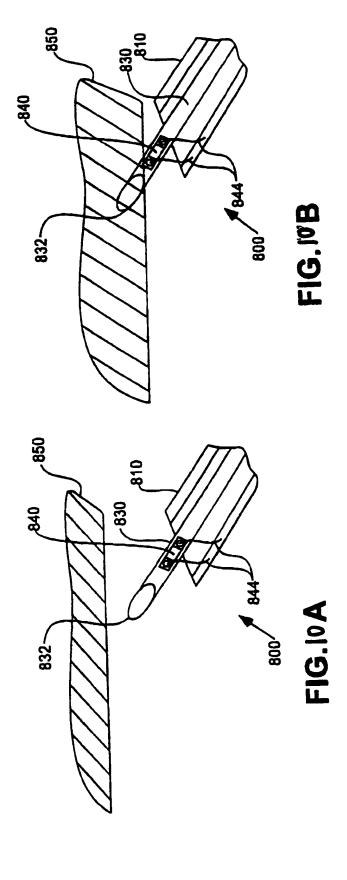
Stop, penetration depth achieved

Slow, tip is occluded

Go, advance needle

FIGURE 9





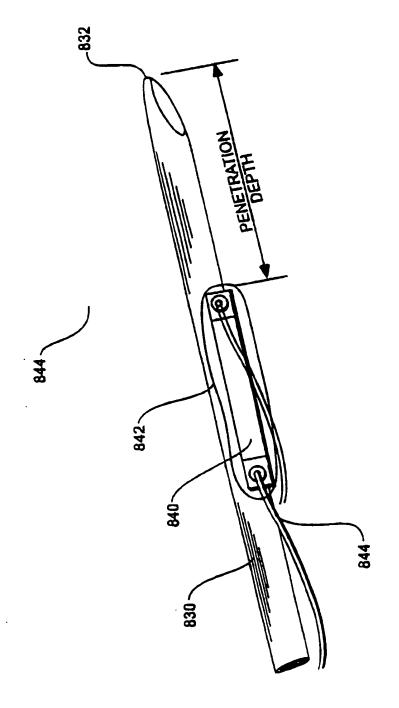
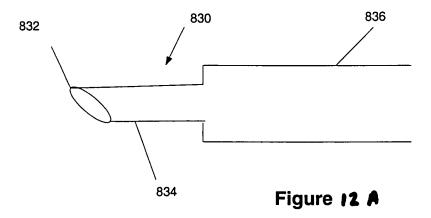
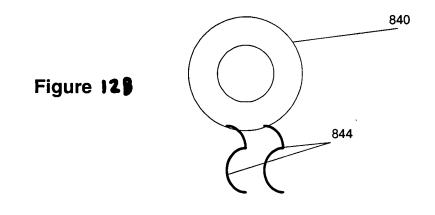


FIG. 11





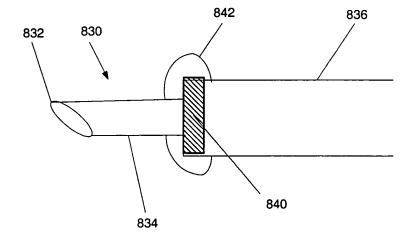
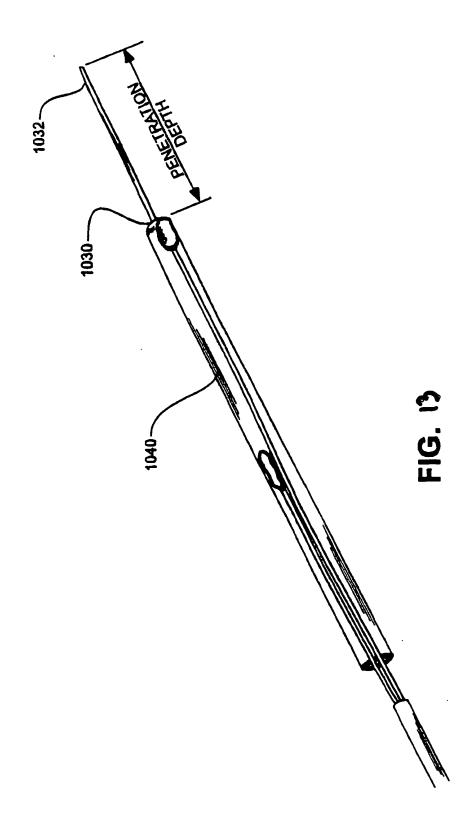


Figure 12C



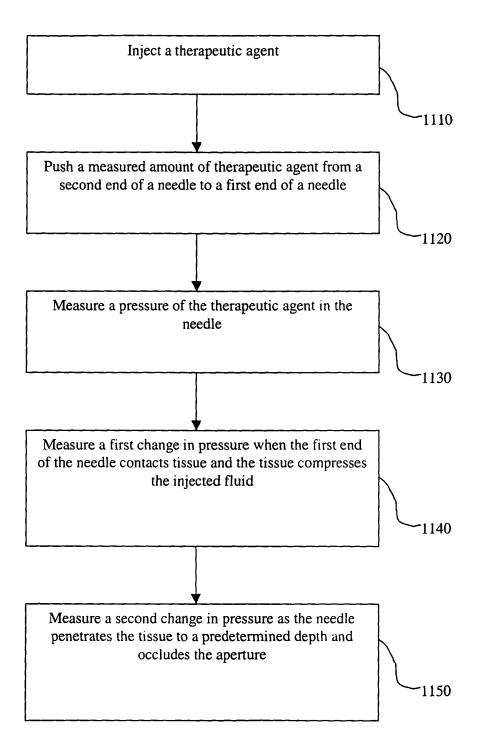


FIG. 14

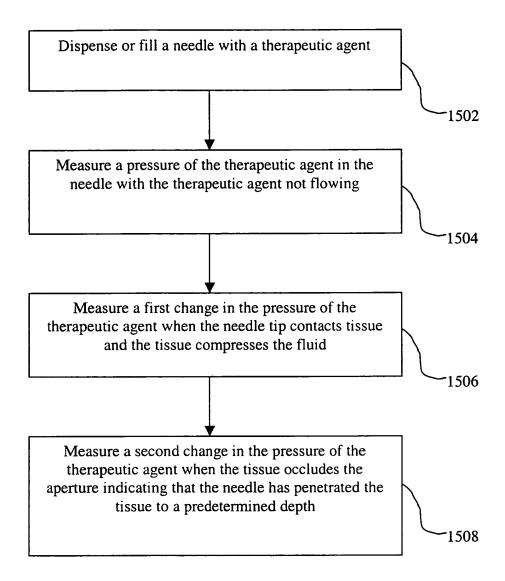


FIG. 15